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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/060,486	01/30/2002	Min-Hee Cho	5649-915	6925

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EXAMINER

KILDAY, LISA A

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 01/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/060,486

Applicant(s)

CHO ET AL.

Examiner

Lisa A Kilday

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-14 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Election/R strictions

This application contains claims directed to the following patentably distinct species of the claimed invention:

Species are defined by elements A-M below:

A, Removing SOG layer to expose the integrated substrate by:

1. Etch SOG layer through the mask pattern to form a recess (pg. 3 lines 3-6)
2. Etch the bottom, clean the integrated circuit, and form conductive layer in the recess (pg. 3 lines 7-9)

B, Atmospheric gases used during the first and second curing processes (pg. 3 lines 18-20):

1. H₂O
2. O₂
3. N₂
4. H₂
5. NO₂
6. Mixture of #1-5

C, SOG thickness (pg. 3 lines 21-24):

1. Thickness that is adequate to prevent oxidation of IC structure during the second curing process
2. 300-500 Å

D, Etchant gas (pg. 3 lines 25-31):

1. C-F gas

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2. CO gas
3. O₂ gas + inert gas

E, Length of etching (pg. 3 line 31, pg. 4 line 3):

1. 20-50 seconds
2. 5-30 seconds

F, Mask pattern (pg. 4 lines 4-6)

1. Polysilicon
2. Al₂O₃
3. AlN
4. Si₃N₄

G, Pattern (pg. 4 lines 31-33)

1. Gate electrode
2. Bitline electrode
3. Metal interconnect

H, Stopper layer on IC (pg. 4 line 33 – pg. 5 line 1):

1. Stopper layer
2. No stopper layer

I, If H1 is chosen, determine stopper layer material (pg. 5 lines 2-5)

1. Si₃N₄
2. Al₂O₃
3. AlN
4. TiN

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5. TaN

J, Type of SOG (102), (pg. 5 lines 5-9):

1. Silicate
2. Siloxan
3. HSQ
4. Other materials
5. Material with the viscosity of 1.5-1.9 that exists in a liquid state at room temperature

K, Applying SOG (pg. 5 lines 10-20):

1. Spin coating
2. Rotating wafer

L, Hard mask (pg. 5 lines 25-29):

1. Al₂O₃
2. Polysilicon
3. AlN
4. Si₃N₄

M, Etching SOG

1. Do not expose IC (100, pg. 5 lines 30-32)
2. Do not remove lower portion of 102a SOG (pg. 6 lines 15-18)

Applicant is required to pick one embodiment that includes one element from each of the groups A-M. For example, one embodiment A1B1C1D1E1F1G1H1I1J1K1L1M1 would be removing SOG layer to expose the integrated substrate by etching SOG layer

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through the mask pattern to form a recess in H₂O gas, where the SOG thickness is adequate to prevent oxidation of IC structure during the second curing process, etching for 20-50 seconds using a CF etchant, forming a polysilicon mask, on a gate electrode with a stopper layer of Silicon nitride, where the SOG layer is silicate that is applied by spin coating, using a Al₂O₃ hard mask, and etching the SOG to not expose the IC.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over

the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

A telephone call was made to Robert Crouse on 12/26/02 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Conclusion

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0957. See MPEP 203.08.

Any inquiry concerning this communication from the examiner should be directed to Lisa Kilday whose telephone number is (703) 306-5728. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (703) 308-1233. The fax number for the group is (703) 305-3432. MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.

Lisa Kilday

LAK

12/26/02


KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800